that if this enzyme is found in fetal cells, the fetus is free of Tay-Sachs disease. Parents need not, therefore, live in apprehension throughout gestation and for some period thereafter, and if the fetus is unhappily found to have Tay-Sachs disease, an abortion can be considered. Most of the diseases which can be recognized prenatally are, like Tay-Sachs disease, rare, but some may be frequent in certain groups of individuals. Sickle cell anemia is such a disease, but as yet no fully satisfactory prenatal diagnostic procedure exists. Relatively small technical advances should, however, add this disease and possibly another dozen disorders to the list.

These new alternatives pose ethical, psychological and sociomedical problems which neither medicine nor genetics has previously confronted. Given, for example, that it is possible to diagnose with certainty the genotype of an infant with respect to a particular genetic locus prior to birth, and that such a diagnosis reveals an abnormality, abortion of the pregnancy becomes a possible course of conduct. However, is it in the "best" interests of the individuals involved and of society, or is it merely a further manifestation of the decline in moral values which some perceive? Who defends the fetus's rights, if rights exist? If abnormal fetuses are to be aborted what should be the attitude toward carriers of the gene which results in abnormality when in double dose? Efforts to identify whose interests are involved and to determine a "best" strategy have prompted a lively, often stimulating, occasionally acrimonious debate among geneticists, lawyers, physicians, ethicists, theologians, and just plain citizens. No consensus has been forthcoming nor does one seem likely; indeed, at this juncture in time, some of the issues involved seem insuperable, so deep is the conflict of moral values. How, for example, can one maintain that a fetus has no legal right to life which transcends parental self-interest, on the one hand, and yet on the other, hold culpable a third party in the event of the accidental loss of the fetus? Legal precedents exist for both of these seemingly contradictory "rights." Similarly, if a pregnancy can be legally interrupted at parental insistence but hours before delivery, why should the same act moments after delivery be murder? Or suppose the day arrives, as surely it must, when we recognize prenatally not only defect but great potential, would then society's continued need for minds of exceptional caliber outweigh the fact that insofar as the parents may be concerned the pregnancy was "unwanted?" To whom does mankind's corporate genetic material belong—to those unborn or to those of us who are but temporary custodians of it? And if the former, is the couple who voluntarily abstains from parenthood, a laudable act in the minds of many in view of the "population crisis," guilty of a kind of genocide? Evolutionists will argue that genetic variability must be a good thing, for witness its ubiquity; is it, therefore, to man's long term advantage to eliminate variation?

These are the emotionally charged issues with which we now wrestle. Some resolution is imperative in our view, for the horizon holds even more difficult legal and moral issues. At the moment, it will undoubtedly seem unwarrantedly futuristic to call attention to the ethical and social problems posed by the asexual reproduction of individuals, *cloning*, or the use of *surrogate wombs*, that is, fetal implantation, but substantial strides have been made experimentally toward both of these ends. "*Genetic engineering*," at least insofar as it implies either chemically (*transformation*) or virally (*transduction*) directed changes of human DNA, holds fewer threats to our moral integrity. We have long since accepted ablative surgery, substitution therapy, and the like as legitimate means of coping with inherited disease, and "genetic engineering" is merely a more permanent solution to the same sorts of problems. Moreover, it falls more naturally into the traditional pattern of disease and treatment.

Not all of the attention of individuals concerned with the future of genetic counseling is focused upon these larger issues; some interest has centered on more mundane considerations such as the qualifications of the counselor. What academic credentials should he or she possess? Must the counselor be a physician? Should counseling be restricted to major medical centers where the specialized supportive diagnostic services are not only available, but of exceptional quality? Or should it be available everywhere with the probable consequent lowering of quality? Should it be a service recognized by health insurance agencies? If so, and if parents permit a pregnancy to go to term which will certainly terminate in a defective child, what is the obligation of the insurance agency? Questions such as this and countless others, including that of licensure, will only be resolved in the courts. We may expect, therefore, a flurry of legal activity out of which new boundaries to human conduct will emerge. Hopefully the issues of health and well-being, individual and societal, will not be sacrificed to the excitement of defining new legal frontiers or the creation of further specialty boards.

The above editorial has been prepared by David L. Rossmann and William J. Schull, School of Public Health, University of Texas at Houston, Houston, Texas 77027, at the request of the editor.

LETTERS to the editor

The Legitimacy of Predicting Public Health Problems

The laboratories of the public health practitioner are communities throughout the United States. All age groups are represented, as is sex, race and other demographic information which allows us to focus on populations experiencing normal or unusual change. Communicable diseases may be charted monthly with the aid of a regular reporting system because of the speed in which the victim is affected. Trends or cyclicity of disease can be projected which thus enables communities to defend themselves.

Chronic diseases do not have the above mentioned advantages. Thus, their prevalence is not only inaccurate but increases or decreases are determined long after chronic disease trends have become manifest. The same may be said of mortality data—which records actually an historical event. Can public health intervention effectively alter the trends in mortality or chronic diseases?

Let us now look at one of the problems of our time that is becoming

increasingly more severe—air pollution. We have information which leads us to conclude that there are segments of our population who are more susceptible to the effects of excessive air pollution. We can identify two major groups:

- Persons with cardio-pulmonary disease
- The aged population

If there is agreement on the susceptible population it is now necessary to look at the laboratory available to us all.

Over the last several decades a demographic shift has occurred in communities in the U. S. Large cities have become larger; small cities and towns have lost population. One of the major groups who have migrated and continue to migrate to large cities is the younger population—let us say those under 30 years of age. With the younger big city population has come increased birth rates and all other elements attributable to younger people. The percentage of young people in large city populations has increased over the years.

Small cities and towns which have an appreciable exodus of young people have a correspondingly higher percentage of older persons making up their population. Statistics will bear out this demographic shift in small cities and towns throughout the U. S.

To legitimately *predict* a public health problem, a third factor must be focused upon. Small cities and towns are politically weak jurisdictions. Although heard in debate, lacking political muscle they must bow to the more powerful politics of large urban areas, and docilely accept decisions made for them.

In the southwestern U. S. it is in these weak political jurisdictions where massive fossil fuel burning power plants are locating. Conceivably in other areas of the country large automated industrial complexes are being built or planned in or near towns without the towns benefiting from an influx of younger persons. Particulate pollutants and sulfur dioxide will be released into the atmosphere in amounts of hundreds of tons per day. Residing in these same weak political jurisdictions is a higher percentage of older persons who very well may be more susceptible to air pollution insults.

If there is substance to cause and effect of excessive air pollution; if demographic shifts are occurring; if it is legitimate to relate the above stated factors; then one may predict that with increased levels of pollution the mortality rates of small cities and towns will increase with the passage of time.

Ben Chaiken
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Health Workers' Morale

One interesting litmus of the morale of health workers may be evidenced by the attendance at a recent conference in New York City. Sponsored by the New York Academy of Medicine, the annual two day spring conference was devoted this year to a timely subject, the Problem of the Aging.

Superficially, the conference bore identical resemblance to those of years past. The printed invitations and registration were unchanged, the parking was impossible, the box lunch was familiarly tasteless and the hall was full.

There was a change, however. The audience, primarily women, sat stolidly through the presentations with a patience that implied that they had never heard it before, or that they didn't mind hearing it again and again. The somber, almost deadly attention, remained unbroken in the most eerie manner.

This is not the way I remember public health conferences! Where were all the ambitious public health workers who used to enliven the meetings by stalking in and out because their own business was so much more important? Where were all the leaders, the "big shots", the "politkers", who used to congregate in far corners, whispering loudly? Where were all the conversations interrupted by the sudden appearance of an important person tugging at the elbow?

Where, in fact, was everybody? In vain one looked about for familiar faces, for veterans of former campaigns, for people with whom to commemorate and rehash old times (by old times I mean events occurring less than five years ago!)

Afterwards, the microphones set up in the corridors for questions stood relatively empty, quite unlike those earlier days when people would line up by the dozens to get their point across. It was creepy.

Perhaps it is well that attending conferences should now be delegated. But though the future of any endeavor rests in the hands of the young, they need continued leadership and stimulation. I guess that where conferences are concerned, public health professionals, like old soldiers, often fade away.

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Epidemiology and Drug Dependence

In the March volume (63 No. 3) Robert Levengood, M.D., Paul Lowinger, M.D., and Kenneth Schooff, M.D., publish an interesting article "Heroin Addiction in the Suburbs—An Epidemiologic Study."

Under "Method" it is stated i.e.:

> The objectives of this study were to examine the various patterns of heroin abuse in the community and estimate to some degree its prevalence. For these purposes heroin abuse was regarded as an infectious disease and epidemiological methods were applied patterned after the work of de Alarcon in England. As heroin abuse is a practice transmitted from one individual to another it is analogous to an infectious disease and epidemiological methods are applicable.

This may be read to mean that the authors mean: 1) that heroin abuse has close analogies to an infectious disease; and 2) that the epidemiological methods can only advantageously be applied to infectious diseases.

In my view, none of these attitudes can be substantiated.

This does not mean that epidemiological methods cannot be applied in the study of drug dependence, on the contrary, but this is not because drug dependence fruitfully can be regarded as a contagious disease—although, of course, interhuman relationships and "social contagiousness" play a role. The reason why epidemiological methods can, and should, be applied to drug dependence is, in my view, that we have to do with a very complex and multifactorial phenomenon. It is just in the study of multifactorial phenomena that the epidemiological methods have demonstrated to be indispensible, regardless of whether we have to do with contagious diseases or not. Do we not speak rightly of the epidemiology of childbirths, the epidemiology of traffic accidents and the epidemiology of heart infarction, to mention only a few?

I have a special reason for writing